SURFACE COMPUTING

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ABSTRACT:

A Surface computer is able to recognize physical objects from a paintbrush to a cell phone and allows hands-on, direct control of content such as photos, music and maps. Surface turns an ordinary tabletop into a dynamic surface that provides interaction with all forms of digital content through natural gestures, touch and physical objects.

The new product is aimed directly at hotels, retail establishments, restaurants and public entertainment venues and should be commercially available towards the end of the year.

It’s an interesting product in that it’s completely out of left field. Microsoft gives examples of ordering a beverage during a meal with just the tap of a finger and quickly browsing through music and dragging favorite songs onto a personal playlist by moving a finger across the screen. Build this into a bar and you’d get one-touch beer service although I’m not sure if they’ve found a way to work out when your beer glass is empty so replenishment becomes automatic, maybe in a later version.

All Things Digital conference Wednesday, Microsoft CEO Steve Ballmer will unveil Microsoft Surface, the first in a new category of surface computing products from Microsoft that will “break down traditional barriers between people and technology”.

INTRODUCTION:

Bill Gates introduced a new 150-pound coffee table ‘surface computer’ computer on May 30th. He bragged, Instead of a computer on every desktop, it will be every desktop is a computer.” Microsoft Surface, running Windows Vista, has a 30-inch display under a hard-plastic tabletop, allows people to touch and move objects on-screen
for everything from digital finger painting and jigsaw puzzles to ordering off a virtual menu in a restaurant.

One cool application is that one can just lay a digital camera onto the Surface PC and the photos on that camera’s card “spill out” on the Desktop. Using your hands, you can rearrange the photos, resize them or discard them.

**Microsoft Surface Computer - Multi Touch Technology**

The "Surface" computer is a 30-inch tabletop LCD that can be used by multiple people at the same time. Microsoft says, that the interactive display can recognize physical objects identification tags similar to bar codes, such as cellphones or chip-enhanced paintbrushes, but also enable users to engage in "hands-on" activities such as "digital finger painting" and interact with content through touch and "natural gestures".

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**Experience Microsoft Surface:**

There are many innovative gadgets in the market. Software and hardware, now offer a lot of excitement. Imagine the ideal combination of hardware and software. The result – Microsoft Surface. You may go though the many videos on Internet to experience Microsoft Surface features. These videos released by Microsoft deal with real life applications and not simple PowerPoint presentations. Seeing is believing. However to experience Microsoft Surface in person, you may have to wait for some more time, before some hotels and restaurants start using these ‘intelligent tables’ to serve their customers.

**Intelligent tables:**

Imagine you going to a restaurant and place a wine glass on the table which is actually a Microsoft Surface. The wine menu appears. You select the wine of your choice and the order is received by the staff, without a single word of verbal communication. And only one needs to order? No. This accepts multiple ‘touch’ and many people may select the item on the menu and drag the item they want to order with their fingers to place the order. Starwood Hotels & Resorts Worldwide has tied up with Microsoft to enable you to experience Microsoft Surface in their place.
Another demo shows how to experience Microsoft Surface by comparing two mobile phones. Just place a mobile phone on the Microsoft Surface. The system identifies the same (probably with a special barcode?) and displays the specifications and prices. You place another mobile phone on the Microsoft Surface. The specifications for this are also shown. When you slide the mobile phones together, a comparison of both is shown, to enable you to decide to buy the one that suits you.

Today’s computers allow you to have multiple applications in multiple windows. But they may have only one key board and one mouse. And only one person can operate at a time. If you want to watch photo album on your computer along with three or four of your friends, just imagine every one trying to see them. Microsoft Surface allows people to sit across in different positions and
watch the images. Spread the photos across the Microsoft Surface and any one can pull photos towards them like you pull physical photos, with fingers. Turn them as you like. You can zoom in or zoom out just by pulling the opposite corners of the image with your hands. Can you wait to experience Microsoft Surface? You can even play multiple videos on the surface just by tapping the video file with your finger, like we do now with a mouse!

An Idea Inspired by Cross-Division Collaboration

Beyond the Mouse and Keyboard

Surface computing is a major advancement that moves beyond the traditional user interface to a more natural way of interacting with digital content. Microsoft Surface™, Microsoft Corp.’s first commercially available surface computer, breaks down the traditional barriers between people and technology to provide effortless interaction with all forms of digital content through natural gestures,
In 2001, Stevie Bathiche of Microsoft Hardware and Andy Wilson of Microsoft Research began working together on various projects that took advantage of their complementary expertise in the areas of hardware and software. In one of their regular brainstorm sessions, they started talking about an idea for an interactive table that could understand the manipulation of physical pieces. Although there were related efforts happening in academia, Bathiche and Wilson saw the need for a product where the interaction was richer and more intuitive, and at the same time practical for everyone to use. This conversation was the beginning of an idea that would later result in the development of Surface, and over the course of the following year, various people at Microsoft involved in developing new product concepts, including the gaming-specific PlayTable, continued to think through the possibilities and feasibility of the project. Then in October 2001 a virtual team was formed to fully pursue bringing the idea to the next stage of development; Bathiche and Wilson were key members of the team.

**Humble Beginnings on an IKEA Table**

In early 2003, the team presented the idea to Bill Gates, Microsoft chairman, in a group review. Gates instantly liked the idea and encouraged the team to continue to develop their thinking. The virtual team expanded, and within a month, through constant discussion and brainstorming, the first humble prototype was born and nicknamed T1. The model was based on an IKEA table with a hole cut in the top and a sheet of architect vellum used as a diffuser. The evolution of Surface had begun. A variety of early applications were also built, including pinball, a photo browser and a video puzzle. As more applications were developed, the team saw the value of the surface computer beyond simply gaming...
and began to favor those applications that took advantage of the unique ability of Surface to recognize physical objects placed on the table. The team was also beginning to realize that surface computing could be applied to a number of different embodiments and form factors.

Over the next year, the team grew significantly, including the addition of Nigel Keam, initially software development lead and later architect for Surface, who was part of the development team eventually tasked with taking the product from prototype to a shipping product. Surface prototypes, functionality and applications were continually refined. More than 85 early prototypes were built for use by software developers, hardware developers and user researchers.

One of the key attributes of Surface is object recognition and the ability of objects placed on the surface to trigger different types of digital responses, including the transfer of digital content. This feature went through numerous rounds of testing and refining. The team explored various tag formats of all shapes and sizes before landing on the
domino tag (used today) which is an 8-bit, three-quarter-inch-square tag that is optimal thanks to its small size. At the same time, the original plan of using a single camera in the vision system was proving to be unreliable. After exploring a variety of options, including camera placement and different camera lens sizes, it was decided that Surface would use five cameras that would more accurately detect natural movements and gestures from the surface.

**Hardware Design**

By late 2004, the software development platform of Surface was well-established and attention turned to the form factor. A number of different experimental prototypes were built including “the tub” model, which was encased in a rounded plastic shell, a desk-height model with a square top and cloth-covered sides, and even a bar-height model that could be used while standing. After extensive testing and user research, the final hardware design (seen today) was finalized in 2005. Also in 2005, Wilson and Bathiche introduced the concept of surface computing in a paper for Gates’ twice-yearly “Think Week,” a time Gates takes to evaluate new ideas and technologies for the company.

The next phase of the development of Surface focused on continuing the journey from concept to product. Although much of what would later ship as Surface was determined, there was significant work to be done to develop a market-ready product that could be scaled to mass production. “So
much work goes into turning a prototype into a product that can handle the strain and stress of everyday use,” Keam said. “For instance, when we developed the T1 prototype, it couldn’t be moved without having to recalibrate it. Now, obviously the product can easily be moved. To get Surface to where it is today, the code had to be rewritten from the ground up.”

In early 2006, Pete Thompson joined the group as general manager, tasked with driving end-to-end business and growing development and marketing. Under his leadership, the group has grown to more than 100 employees. Today Surface has become the market-ready product once only envisioned by the group, a 30-inch display in a table-like form factor that’s easy for individuals or small groups to use collaboratively. The sleek, translucent surface lets people engage with Surface using touch, natural hand gestures and physical objects placed on the surface. Years in the making, Microsoft Surface is now poised to transform the way people shop, dine, entertain and live.

“Seeing Surface grow from a small germ of an idea to a working prototype and then to a full-fl edged market ready product has been an amazing journey,” Wilson said. “This is a radically

different user-interface experience than anything Microsoft has done before, and it’s really a testament to the innovation that comes from marrying brilliance and creativity.

Surface Computing:
Surface computing breaks down traditional barriers between people and technology, changing the way people interact with all kinds of everyday content, from photos to maps to menus. The intuitive user interface works without a traditional mouse or keyboard, allowing people to interact with content and information by using their hands and natural movements. Users are able to access information either on their own or collaboratively with their friends and families, unlike any experience available today.

Surface Computing Technology
1. Screen

A diffuser turns the Surface's acrylic tabletop into a large horizontal "multitouch" screen, capable of processing multiple inputs from multiple users. The Surface can also recognize objects by their shapes or by reading coded "domino" tags.

2. Infrared

Surface's "machine vision" operates in the near-infrared spectrum, using an 850-nanometer-wavelength LED light source aimed at the screen. When objects touch the tabletop, the light reflects back and is picked up by multiple infrared cameras with a net resolution of 1280 x 960.

3. CPU

Surface uses many of the same components found in everyday desktop computers. A Core 2 Duo processor, 2GB of RAM and a 256MB graphics card. Wireless communication with devices on the surface is handled using WiFi and Bluetooth antennas (future versions may incorporate RFID or Near Field Communications). The underlying operating system is a modified version of Microsoft Vista.

4. Projector

Microsoft's Surface uses the same DLP light engine found in many rear-projection HDTVs. The footprint of the visible light screen, at 1024 x 768 pixels, is actually smaller than the invisible overlapping infrared projection to allow for better recognition at the edges of the screen.

Surface computing features four key attributes:

1. Features:

Direct interaction.

Users can actually “grab” digital information with their hands and interact
with content through touch and gesture, without the use of a mouse or keyboard.

**Multi-user experience.**

The horizontal form factor makes it easy for several people to gather around surface computers together, providing a collaborative, face-to-face computing experience.

**Object recognition.**

Users can place physical objects on the surface to trigger different types of digital responses, including the transfer of digital content.

**Multi-touch display.**

The Surface display is capable of multi-touch interaction, recognizing dozens and dozens of touches simultaneously, including fingers, hands, gestures and objects placed on the surface.

**Horizontal orientation.**

The 30-inch display in a table-sized form factor allows users to share, explore and create experiences together, enabling a truly collaborative computing experience.

**Dimensions.**

Surface is 22 inches high, 21 inches deep and 42 inches wide.

**Materials.**

The Surface tabletop is acrylic, and its interior frame is powder-coated steel.

**Requirements:**

Standard American 110–120V power

**System:**

The Surface custom software platform runs on Windows Vista™ and has wired Ethernet 10/100 and wireless 802.11 b/g and Bluetooth 2.0 connectivity.

**Availability:**

Beginning at the end of this year, consumers will be able to interact with Surface in hotels, restaurants, retail establishments and public entertainment venues.

**Applications:**

Mark - I can foresee a day where the Microsoft Surface replaces the conference room table. No more handing out copies of documents or sending e-mail to people who didn’t get the presentation. Everything can be shared at the table electronically. What about reserving the room to begin with? If the Surface is in the lobby, you could find out which rooms were being used for which meetings, which were
available, etc. And if you missed the meeting, how about being able to simply drag the meeting notes and other materials onto your laptop, cell phone or other portable device?

Comment says - I’d also think tablet PC or notepad to write things down then send it to your desk. For desktop publishing it would be phenomenal to be able to move clips around the way you do now to create a physical mockup, then print it. Especially if it had the capability to scan items into memory right there.

It also has the potential to be a good learning tool for children with disabilities who may not be able to use a keyboard/mouse as easily. If it got thinner, airlines could put games, brochures and purchasing capabilities at each seat - not to mention call button, etc. Link.

CONCLUSION:

Beyond Surface — Surface Computing Tomorrow

Although surface computing is a new experience for consumers, over time Microsoft believes there will be a whole range of surface computing devices and the technology will become pervasive in people’s lives in a variety of environments. As form factors continue to evolve, surface computing will be in any number of environments — schools, businesses, homes — and in any number of form factors — part of the countertop, the wall or the refrigerator.

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